

Application No. 09/825,159

Reply to Office Action dated February 10, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method in a wearable computing device for presenting information to a user of the wearable computing device based on at least one of multiple defined themes, a current context of the user being represented by a plurality of context attributes that each model an aspect of the context, each of the defined themes modeling a distinct contextual situation of the user that has multiple contextual aspects by specifying multiple context attributes and by specifying one or more possible values associated with each of the specified context attributes, each defined theme having at least one associated theme layout that specifies information appropriate to the contextual situation of the theme and that specifies a manner of presenting the specified information to the user, comprising:
 - receiving an indication of the multiple defined themes;
 - receiving an indication of current context information about the user that includes current values for each of the plurality of context attributes;
 - determining for each of the multiple defined themes whether the user is in the contextual situation modeled by the defined theme such that each of the context attributes specified for the defined theme has a current value indicated in the received current context information that matches one of the specified possible values associated with that context attribute;
 - selecting a current theme from among multiple defined themes that are determined to have modeled contextual situations which the user is in, the current theme selected to have a highest associated priority among those defined themes;
 - selecting one of the theme layouts associated with the selected current theme; and
 - presenting information to the user that is appropriate to the selected current theme by gathering the information specified by the selected theme layout and presenting the gathered information in the manner specified by the selected theme layout,

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so that the user receives information that is appropriate to a contextual situation in which the user is situated.

2. (Original) The method of claim 1 including, after the presenting of the information to the user that is appropriate to the selected current theme:

receiving an indication of changes to the current context information; and

in response to the indicated changes,

selecting a new current theme that models a new contextual situation that the user is in due to the changed context information, the new current theme such that each of the context attributes specified for the theme has a current value indicated in the changed context information that matches one of the specified possible values associated with that context attribute;

selecting a new theme layout that is associated with the new current theme; and

presenting information to the user that is appropriate to the new current theme by gathering the information specified by the new theme layout and presenting the gathered information in the manner specified by the new theme layout.

3. (Original) The method of claim 1 including, after the presenting of the information to the user that is appropriate to the selected current theme:

receiving an indication of an instruction from the user to change the presented information in a specified manner; and

in response to the indicated instruction,

selecting a new theme layout that specifies a manner of presenting information that is consistent with the specified manner indicated by the user; and

presenting information to the user by gathering the information specified by the new theme layout and presenting the gathered information in the manner specified by the new theme layout.

4. (Original) The method of claim 3 wherein the specified manner indicated by the user includes an indication to select a specified theme as a new current theme, and wherein the new theme layout that is selected is associated with the new current theme.

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5. (Original) The method of claim 1 wherein the selected theme layout additionally specifies interaction controls to be presented to the user to provide functionality that is appropriate to the contextual situation modeled by selected current theme, and wherein the presenting of the information to the user includes presenting the specified interaction controls.

6. (Original) The method of claim 1 including, before the receiving of the indication of the multiple defined themes:

receiving an indication from the user to define a new theme;

receiving indications from the user that specify multiple context attributes for the new theme;

receiving indications from the user that specify one or more possible values associated with each of the specified context attributes; and

storing the new theme along with indications of the specified multiple context attributes and the specified one or more possible values associated with each of the specified context attributes,

and wherein the stored new theme is one of the indicated multiple defined themes.

7. (Original) The method of claim 1 including distributing one of the multiple defined themes to a computing device of another user for use in presenting information that is appropriate to the contextual situation modeled by the one defined theme to the other user.

8. (Original) The method of claim 7 including, before the distributing of the one defined theme to the computing device of the other user, receiving payment for the one defined theme from the other user or from the computing device of the other user.

9. (Original) The method of claim 7 wherein the use of the one defined theme by the computing device of the other user includes determining whether the other user is in the contextual situation modeled by the one defined theme such that each of the context attributes specified for the one defined theme has a current value indicated in current context information for the other user that matches one of the specified possible values associated with that context attribute.

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10. (Original) The method of claim 7 wherein the distributing of the one defined theme includes distributing the theme layouts associated with the one defined theme.

11. (Original) The method of claim 10 wherein the presenting to the other user of the information that is appropriate to the contextual situation modeled by the one defined theme includes using one of the distributed theme layouts, and wherein the one distributed theme layout that is used for the presenting specifies the information to be presented in a manner relative to a user of the computing device using the one distributed theme layout, so that the information presented to the other user includes information specific to the other user.

12. (Original) The method of claim 7 wherein the distributing of the one defined theme includes distributing other information related to the theme that includes a context attribute that is specified by the one defined theme, a context server module able to provide values for one or more context attributes specified by the one defined theme and/or a context client module capable of receiving information related to the one defined theme and of producing responses appropriate to the contextual situation modeled by the one defined theme.

13. (Original) The method of claim 1 including receiving a theme from another computing device before the receiving of the indication of the multiple defined themes, and wherein the received theme is one of the indicated multiple defined themes.

14. (Original) The method of claim 13 including, before the receiving of the theme, providing access information indicating authority to receive the theme.

15. (Original) The method of claim 13 including customizing the received theme based on explicit indications received from the user.

16. (Original) The method of claim 13 including customizing the received theme based on likely user preferences determined without intervention by the user.

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17. (Original) The method of claim 1 including monitoring the user or a surrounding environment of the user in order to produce the current context information.

18. (Original) The method of claim 1 wherein the contextual situations modeled by the multiple defined themes relate to activities of the user.

19. (Original) The method of claim 1 wherein for each of the defined themes that is determined to have a modeled contextual situation which the user is in, the priority associated with that theme is based on a calculated degree of match between the current values indicated in the received current context information and the specified possible values associated with the context attributes for that theme.

20. (Original) The method of claim 1 wherein for each of the defined themes that is determined to have a modeled contextual situation which the user is in, the priority associated with that theme is based on a degree of interest of the user for the contextual situation modeled by that theme.

21. (Original) The method of claim 1 wherein for each of the defined themes that is determined to have a modeled contextual situation which the user is in, the priority associated with that theme is based on a degree of importance of the contextual situation modeled by that theme.

22. (Original) A method in a computing device for providing an appropriate response to a contextual situation based on at least one of multiple themes, a context being represented by a plurality of context attributes and their associated values, each of the themes representing a contextual situation by specifying multiple context attributes related to the contextual situation and by specifying criteria for determining values of the specified context attributes that match the contextual situation, each of the themes associated with at least one type of response that is appropriate to the contextual situation, the method comprising:

receiving an indication of a context that includes values for at least some of the plurality of context attributes;

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identifying one of the multiple themes that matches the indicated context by using the specified criteria for the theme to determine that the included values of the indicated context contain values of the specified context attributes for the theme that match the contextual situation for the theme;

selecting one of the types of responses that are associated with the identified theme; and
providing the selected type of response.

23. (Original) The method of claim 22 wherein the selected type of response for the identified theme includes presenting information to a user of the computing device that is appropriate to the contextual situation for the identified theme.

24. (Original) The method of claim 22 wherein the selected type of response for the identified theme includes providing functionality to a user of the computing device that is appropriate to the contextual situation for the identified theme.

25. (Original) The method of claim 22 wherein the selected type of response for the identified theme includes presenting interaction controls to a user of the computing device that are appropriate to the contextual situation for the identified theme.

26. (Original) The method of claim 22 wherein the indicated context is a current context of the computing device and/or of a user of the computing device.

27. (Original) The method of claim 22 including, after the providing of the selected type of response:

receiving an indication of changes to the indicated context that include changed values of at least some of the plurality of context attributes; and

in response to the indicated changes,

identifying a new theme that matches the changed context by using the specified criteria for the new theme to determine that the changed context includes values of the specified context attributes for the new theme that match the contextual situation for the new theme;

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selecting a new one of the types of responses that are associated with the new theme; and

providing the selected new type of response.

28. (Original) The method of claim 27 wherein the indicated changes to the context are based on explicit instructions from a user of the computing device to make the indicated changes.

29. (Original) The method of claim 27 wherein the indicated changes to the context are based on changes in a surrounding environment.

30. (Original) The method of claim 22 including, after the providing of the selected type of response:

receiving an indication from a user to change the provided type of response in a specified manner; and

in response to the indication,

selecting a new type of response that is consistent with the specified manner indicated by the user; and

providing the selected new type of response.

31. (Original) The method of claim 30 wherein the specified manner indicated by the user includes an indication to select a specified theme as a new current theme, and wherein the new type of response that is selected is associated with the new current theme.

32. (Original) The method of claim 22 wherein multiple themes are determined to match the indicated context, and wherein the identified theme is selected from among the multiple determined themes.

33. (Original) The method of claim 32 wherein each of the multiple determined themes have an associated priority, and wherein the selection of the identified theme is based on the priority of the identified theme.

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34. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a calculated degree of match to the indicated context.

35. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a category of the theme.

36. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a group of which the theme is a member.

37. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a hierarchical relationship of that theme to other themes.

38. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a degree of attention with which a user of the computing device is focused on the contextual situation represented by that theme.

39. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a degree of interest of a user of the computing device in the contextual situation represented by that theme.

40. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a degree of importance of the contextual situation represented by that theme.

41. (Original) The method of claim 33 wherein the priority associated with each of the multiple determined themes is based on a degree of urgency of the contextual situation represented by that theme.

42. (Original) The method of claim 22 including, before the identifying of the theme:

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receiving an indication from a user to define a new theme representing a contextual situation;

receiving indications from the user that specify multiple context attributes for the new theme that are related to the contextual situation;

receiving indications from the user that specify criteria for determining values of the specified context attributes that match the contextual situation; and

storing the new theme along with indications of the specified multiple context attributes and the specified criteria,
and wherein the identified theme is the new theme.

43. (Original) The method of claim 42 including:

receiving indications from the user to define a theme layout to be associated with the new theme, the defined theme layout representing presenting information to the user as a type of response that is appropriate to the contextual situation represented by the new theme, the defined theme layout including specifications of indicated information and an indicated manner of presenting the indicated information; and

defining the theme layout in response to the received indications.

44. (Original) The method of claim 42 wherein at least one of the specified context attributes for the new theme is a new context attribute, and including:

receiving indications from the user to define the new context attribute; and
defining the new context attribute in response to the received indications.

45. (Original) The method of claim 44 including receiving indications from the user to generate a new context server module capable of generating values for the new context attribute, and generating the new context server module in response to the received indications.

46. (Original) The method of claim 42 including receiving indications from the user to generate a new context client module capable of receiving information related to the new theme and of producing responses appropriate to the contextual situation represented by the new theme, and generating the new context client module in response to the received indications.

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47. (Original) The method of claim 22 including distributing one of the multiple themes to an other computing device for use in providing appropriate responses with the other computing device to the contextual situation represented by the one theme.
48. (Original) The method of claim 47 wherein the distributing is in response to a received request from a user of the other computing device.
49. (Original) The method of claim 47 wherein the distributing is in response to a received request generated automatically by the other computing device.
50. (Original) The method of claim 47 including, before the distributing of the one theme to the other computing device, determining that the one theme is appropriate for the other computing device, and wherein the distributing is in response to the determining.
51. (Original) The method of claim 50 wherein the determining that the one theme is appropriate for the other computing device is based on a determination that the one theme is appropriate for a user of the other computing device.
52. (Original) The method of claim 47 including, before the distributing of the one theme to the other computing device, receiving payment for the one defined theme.
53. (Original) The method of claim 47 including, before the distributing of the one theme to the other computing device, receiving access information indicating authority of the other computing device to receive the one theme.
54. (Original) The method of claim 53 wherein the indicated authority is based on a user of the other computing device.
55. (Original) The method of claim 47 wherein use of the one theme by the other computing device includes determining whether the one theme matches a context of the other computing device by using the specified criteria for the theme to determine that the context of the

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other computing device contains values of the specified context attributes for the one theme that match the contextual situation for the theme.

56. (Original) The method of claim 47 wherein use of the one theme by the other computing device includes determining whether the one theme matches the indicated context by using the specified criteria for the theme to determine that the included values of the indicated context contain values of the specified context attributes for the theme that match the contextual situation for the theme.

57. (Original) The method of claim 47 wherein the distributing of the one theme includes distributing a theme layout associated with the one theme.

58. (Original) The method of claim 57 wherein the distributed theme layout specifies information to be presented in a manner relative to a user of a computing device that is using the distributed theme layout such that use of the distributed theme layout to present information to an other user of the other computing device presents information specific to the other user.

59. (Original) The method of claim 57 wherein the distributed theme layout specifies information to be presented in a manner independent of a computing device that is using the distributed theme layout such that use of the distributed theme layout to present information to an other user of the other computing device presents the same information as would use of the distributed theme layout to present information to a user of the computing device.

60. (Original) The method of claim 47 wherein the distributing of the one theme includes distributing other information related to the one theme, the other related information including a context attribute that is specified by the one theme, a context server module able to provide values for one or more context attributes specified by the one theme and/or a context client module capable of receiving information related to the one theme and of producing responses appropriate to the contextual situation represented by the one theme.

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61. (Original) The method of claim 22 including receiving a theme from another computing device before the identifying of the theme, and wherein the received theme is the identified theme.
62. (Original) The method of claim 61 wherein the receiving of the theme is in response to a request from a user of the computing device.
63. (Original) The method of claim 61 wherein the receiving of the theme is in response to a request generated automatically by the computing device.
64. (Original) The method of claim 61 including providing payment for the received theme.
65. (Original) The method of claim 61 including providing access information indicating authority to receive the theme.
66. (Original) The method of claim 61 including customizing the received theme based on explicit indications received from a user of the computing device.
67. (Original) The method of claim 61 including customizing the received theme based on likely user preferences of a user of the computing device that are determined without intervention by the user.
68. (Original) The method of claim 67 including, after the determining of the likely user preferences and before the customizing of the received theme, receiving explicit user approval of the customizing.
69. (Original) The method of claim 22 including monitoring a user of the computing device or a surrounding environment of the user in order to produce the included values for the context.

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70. (Original) The method of claim 22 wherein the multiple themes are associated with a user of the computing device.

71. (Original) The method of claim 22 wherein the multiple themes are loaded onto the computing device.

72. (Original) The method of claim 22 wherein the multiple themes are themes accessible to the computing device.

73. (Original) The method of claim 22 wherein the contextual situations represented by the multiple themes are activities of a user of the computing device.

74. (Original) The method of claim 22 wherein the contextual situations represented by the multiple themes are interactions based on a current focus of attention of a user of the computing device on a person or an object.

75. (Original) The method of claim 22 wherein the contextual situations represented by the multiple themes are interactions of a user of the computing device that are related to a location.

76. (Original) The method of claim 22 wherein the specified criteria for the identified theme indicates possible values for each of the specified context attributes.

77. (Original) The method of claim 76 wherein the specified criteria for the identified theme further indicates that some of the specified context attributes are required to have one of the possible values specified for that context attribute in a current context if the identified theme is to match the contextual situation for the identified theme.

78. (Original) The method of claim 22 wherein at least one of the specified context attributes for the identified theme represents information about a user of the computing device.

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79. (Original) The method of claim 78 wherein the represented information reflects a modeled mental state of the user.

80. (Original) The method of claim 22 wherein at least one of the specified context attributes for the identified theme represents information about the computing device.

81. (Original) The method of claim 22 wherein at least one of the specified context attributes for the identified theme represents information about a physical environment.

82. (Original) The method of claim 22 wherein at least one of the specified context attributes for the identified theme represents information about a cyber-environment of a user of the computing device.

83. (Original) The method of claim 22 wherein the identified theme further includes specified logic that can perform appropriate functionality when the identified theme matches a current context.

84. (Original) The method of claim 22 wherein the computing device performs the method on behalf of a user of a thin client computing device.

85. (Original) The method of claim 84 wherein the providing of the selected type of response includes sending information to the thin computing device.

86. (Original) The method of claim 84 wherein the indicated context is a current context of the user.

87. (Original) The method of claim 22 wherein a second of the multiple themes also matches the indicated context, and including providing a second type of response that is associated with the second theme.

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88. (Original) The method of claim 87 wherein the second type of response is provided after the providing of the selected type of response and is provided in a manner so as to supercede the selected type of response.

89. (Original) The method of claim 22 wherein the identified theme further includes permission information that specifies types of access to the identified theme that are allowed.

90. (Original) The method of claim 22 wherein the identified theme further includes security information that specifies access information needed to obtain access to the identified theme.

91. (Original) The method of claim 22 wherein the identified theme further includes a privacy setting that specifies a level of privacy for the identified theme.

92. (Original) The method of claim 91 wherein the privacy setting temporarily overrides other privacy settings while the identified theme matches a current context.

93. (Original) The method of claim 91 wherein the privacy setting determines a data store that is used by the computing device while the identified theme matches a current context.

94. (Original) The method of claim 22 wherein the identified theme further includes a theme-sharing setting that specifies whether information about the identified theme is to be made available to other themes.

95. (Original) The method of claim 94 wherein the theme-sharing setting specifies that the existence of and all other information related to the identified theme is not to be made available to other themes.

96. (Original) The method of claim 22 including distributing one of the multiple themes to an other computing device, and monitoring use of the one theme by the other computing device.

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97. (Original) A computing device for providing an appropriate response to a contextual situation based on at least one of multiple themes, a context being represented by a plurality of context attributes and their associated values, each of the themes representing a contextual situation by specifying multiple context attributes related to the contextual situation and by specifying criteria for determining values of the specified context attributes that match the contextual situation, each of the themes associated with at least one type of response that is appropriate to the contextual situation, comprising:

a context component capable of receiving an indication of a context that includes values for at least some of the plurality of context attributes;

a theme identification component capable of identifying one of the multiple themes that matches the indicated context by using the specified criteria for the theme to determine that the included values of the indicated context contain values of the specified context attributes for the theme that match the contextual situation for the theme; and

a thematic response generator component capable of selecting one of the types of responses that are associated with the identified theme and of providing the selected type of response.

98. (Original) The computing device of claim 97 wherein the context component, theme identification component, and thematic response generator component are executing in memory of the computing device.

99. (Original) The computing device of claim 97 wherein the computing device is a wearable computer.

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100. (Original) A computer system for providing an appropriate response to a contextual situation based on at least one of multiple themes, a context being represented by a plurality of context attributes and their associated values, each of the themes representing a contextual situation by specifying multiple context attributes related to the contextual situation and by specifying criteria for determining values of the specified context attributes that match the contextual situation, each of the themes associated with at least one type of response that is appropriate to the contextual situation, comprising:

means for receiving an indication of a context that includes values for at least some of the plurality of context attributes;

means for identifying one of the multiple themes that matches the indicated context by using the specified criteria for the theme to determine that the included values of the indicated context contain values of the specified context attributes for the theme that match the contextual situation for the theme; and

means for selecting one of the types of responses that are associated with the identified theme and for providing the selected type of response.

101. (Original) A computer-readable medium whose contents cause a computing device to provide an appropriate response to a contextual situation based on at least one of multiple themes, a context being represented by a plurality of context attributes and their associated values, each of the themes representing a contextual situation by specifying multiple context attributes related to the contextual situation and by specifying criteria for determining values of the specified context attributes that match the contextual situation, each of the themes associated with at least one type of response that is appropriate to the contextual situation, by:

receiving an indication of a context that includes values for at least some of the plurality of context attributes;

identifying one of the multiple themes that matches the indicated context by using the specified criteria for the theme to determine that the included values of the indicated context contain values of the specified context attributes for the theme that match the contextual situation for the theme;

selecting one of the types of responses that are associated with the identified theme; and
providing the selected type of response.

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102. (Original) The computer-readable medium of claim 101 wherein the computer-readable medium is a data transmission medium transmitting a generated data signal containing the contents.

103. (Original) The computer-readable medium of claim 101 wherein the computer-readable medium is a memory of a computer system.

104-108. (Canceled.)

109. (Original) A computer-implemented method for use on a wearable computer having a plurality of input devices worn by the user, the method comprising:

under control of first and second attribute providing modules, receiving respective first and second data signals from at least two of the plurality of input devices worn by the user;

under control of the first and second attribute providing modules, generating first and second attribute values in response to the first and second data signals, respectively, wherein the first and second attribute values each reflect a state of the user, a state of the user's physical surroundings, or a state of the user's logical data and telecommunications environment, and wherein the first and second attribute values together represent a thematic data set characterizing the user's context;

under control of an attribute exchange module, receiving the first and second attribute values from the first and second attribute providing modules, respectively;

under control of the attribute exchange module, storing the first and second attribute values;

under control of at least one attribute processing module, receiving the first and second attribute values; and

under control of at least one attribute processing module, providing an output signal in response to the first and second attribute values, wherein the output signal models a characteristic of a current state of the user, and wherein the modeled characteristic of the user's current state cannot be directly measured from the first and second attribute values.

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110. (Original) The method of claim 109 wherein the first and second attribute values each include an attribute name associated with the attribute value, an uncertainty quantity representing a range of likely values around the attribute value, a timestamp representing an effective age of the attribute value, and a units for the attribute value,

wherein providing first and second attribute values includes executing first and second attribute providing modules, each having an associated name, that create and provide the respective first and second attribute values, and

wherein providing an output signal includes executing an attribute processing module that requests, by attribute name, and processes the first and second attribute values.

111. (Original) The method of claim 109 wherein the first and second attribute values respectively represent feelings and behavior parameters, physiological parameters, place parameters, language parameters, human society and institutional parameters, occupational parameters, or entertainment parameters of the user, and wherein the thematic data set characterizes, and the output signal models, the user's mood, health, location, communication, society/institution, occupational, or entertainment context.

112. (Original) The method of claim 109 wherein the thematic data set characterizes for the user a context representing work, entertainment, errands, health, safety, home, family, location, routing, or specialized environments including underwater, space, flight, military and law enforcement environments.

113. (Original) The method of claim 109, further comprising:
receiving third and fourth data signals from another two of the plurality of input devices;
providing third and fourth attribute values in response to the third and fourth data signals that each reflect a state of the user, a state of the user's physical surroundings, or a state of the user's logical data and telecommunications environment, wherein the third and fourth attribute values together represent another thematic data set characterizing the user's context;
receiving the third and fourth attribute values; and
independently of providing the output signal, providing another output signal in response to the third and fourth attribute values, wherein the another output signal models another

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characteristic of a current state of the user, and wherein the another modeled characteristic of the user's current state cannot be directly measured from the third and fourth attribute values.

114. (Original) A computer-readable medium containing instructions that when executed cause a portable computing device having a plurality of input devices to perform the method comprising:

receiving first, second, third and fourth data signals from at least some of the plurality of input devices;

providing first and second attribute values in response to the first and second data signals, wherein the first and second attribute values each reflect a state of the user, a state of the user's physical surroundings, or a state of the user's logical data and telecommunications environment, wherein the first and second attribute values together represent a first thematic data set characterizing the user's context;

providing third and fourth attribute values in response to the first and second data signals, wherein the third and fourth attribute values each reflect a state of the user, a state of the user's physical surroundings, or a state of the user's logical data and telecommunications environment, wherein the third and fourth attribute values together represent a second thematic data set, different from the first thematic data set, that characterizing the user's context;

receiving the first thematic data set by a first client process; and

processing the first thematic data set in the first client process and providing a first output signal in response thereto, wherein the processing of the first thematic data set and providing of the first output signal by the first client process is independent of the second thematic data set.

115. (Original) The computer-readable medium of claim 114 wherein the first, second, third and fourth attribute values each include an attribute name associated with the attribute value and a timestamp representing an effective age of the attribute value, and wherein the method further comprises:

receiving the second thematic data set and first attribute value by a second client process; and

processing the second thematic data set and first attribute value by the second client process and providing a second output signal in response thereto, wherein the processing of the

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second thematic data set first attribute value and providing of the second output signal by the second client process is independent of the first client process, and

wherein first and second output signals model first and second characteristics of a current state of the user, and wherein the first and second modeled characteristics of the user's current state cannot be directly measured from the first and second thematic data sets.

116-141. (Canceled.)